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TRANSFORMING
JOINT TEST AND EVALUATION
MINDSETS AND PROCESSES

ACQUISITION II

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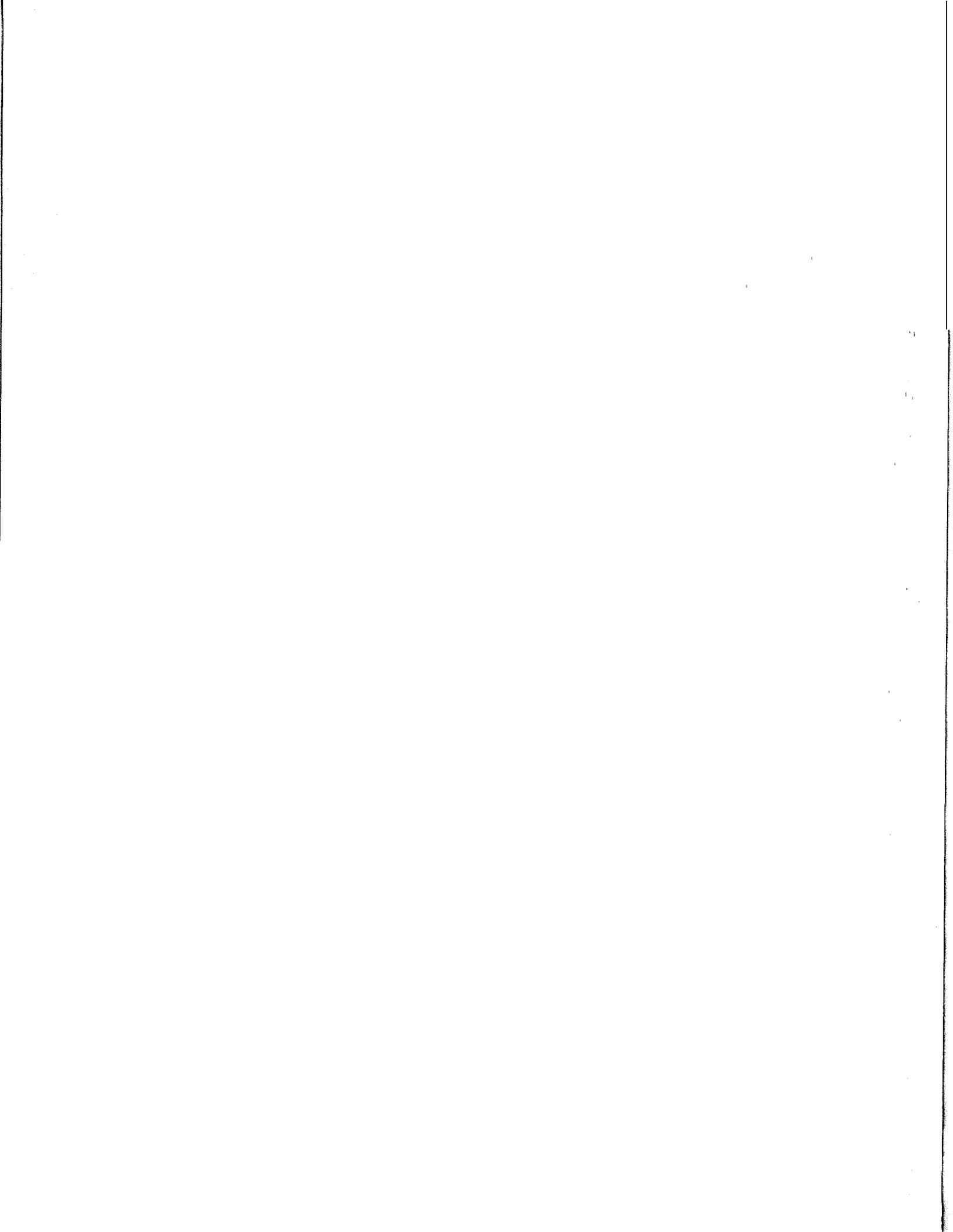
There has been, and is currently, no effective means for conducting productive joint operations tests and evaluations. The fact that some such efforts heretofore have encountered difficulties and achieved few useful results does not obviate the requirements for much needed joint operational test and evaluation (OT&E).   Fitzhugh Commission, 1970

Over the past few decades, there have been numerous catchphrases describing visions for reform in the acquisition community. Commercial-off-the-Shelf Procurement; Cost as an Independent Variable, Simulation-Based Acquisition, and Spiral Development are just a few. The latest such buzzword to hit the Department of Defense *is' Transformation.* According to General Richard B. Myers, Chairman of the Joint Chiefs of Staff, transformation deals more with mindsets and processes than technologies and hardware. Certainly there have been numerous celebrated transformational technologies over the years: the machine gun, the tank, and aircraft - especially stealth - are three prime examples. So how can we incorporate this latest buzzword into the acquisition world, and more specifically into test and evaluation?

In this paper I'll offer some suggestions on how to apply transformation to test and evaluation mindsets and processes, especially as they relate to the joint world. I'll tell some "test stories" about things I think need to be fixed based on my ten years as an F-16 test pilot. I'll also present some broader examples from the Department of Defense headlines to help support my points. Keep in mind that "the ultimate objective of the acquisition process [is] to provide the best and most capable weapon systems to our operational forces."[2] Although, the quote at the top of this page comes from the Blue Ribbon Defense Panel Report concluded over 30 years ago, unfortunately there is still some truth to it today. While we have an established Joint Test and Evaluation (JT&E) program, there are numerous intellectual and cultural obstacles that must be overcome in order to make it effective and efficient. But first a brief background on JT&E - i s origin, set up, purpose, and current projects.

JT&E'S BACKGROUND

The Department of Defense (DoD) Joint Test and Evaluation program is a direct outcome of the 1970 Fitzhugh Commission. Even though the original emphasis was on joint operational testing (OT), the program eventually expanded to also include the developmental testing (VT)'community. The Deputy Director for Test and Evaluation within the Office of the Secretary of Defense (OSD) manages and administers the program, which is headquartered in Alexandria, VA.   This arrangement establishes the OSD JT&E program's independent status, aimed at minimizing the influence of service bias. The program is intended to accomplish the following:

>   Assess the interoperability of service systems in joint operations and explore potential solutions to identified problems.
> - Evaluate and provide recommendations for improvements in joint technical and operational concepts.
>   Validate testing methodologies having multi-service application.
> - Evaluate technical performance of systems under realistic joint operational conditions. [3]

DoD Directive 5000.3-M-4, <u>Joint Test and Evaluation Procedures Manual,</u> establishes the policies and procedures for each JT&E program: It assigns a lead service to conduct each project and designates other participating services to support with personnel and resources, similar to establishing a supported and the corresponding supporting Combatant Commanders during military operations. As of 21 February 2003, there were ten active JT&E programs:

- Joint Battle Damage Assessment
  Joint C2 Intelligence, Surveillance and Reconnaissance
- Joint Close Air Support
  Joint Cruise Missile Defense
- Joint Global Positioning System Combat Effectiveness
  Joint Shipboard Helicopter Integration Process
  Joint Theater Distribution
- Joint Methodology to Assess C4ISR Architecture
  Joint UAV For Time Sensitive Operations
- Joint Logistics / Planning Enhancement [4]

Although the JT&E program has had its successes (e.g. the Joint Direct Attack Munition and the Joint Air-to-Surface Standoff Missile), I don't think it has yet reached its full potential. For example, I've seen biases among our services during my decade of test experience.; I've even worked on a "black" USAF missile program that was classified simply because the US Navy was supposed to have the lead in that particular arena! [5]   This goes decidedly against the whole premise of the JT&E program as outlined above. But probably the biggest speed bump on the road to true joint testing lies between the DT and OT communities, no matter which service they belong to. This rift is where I think transformation is needed the most.

TRANSFORMATION APPLICATIONS FOR JT&E

General Myers outlines three "elements" of transformation: intellectual, cultural, and technological. [6] The first two elements are probably the most applicable to test and evaluation mindsets and processes since they deal with how we think and feel about our line of work. Although I'll offer some suggestions for each of the three elements, I'll concentrate, mostly on the cultural aspects.   Most of my suggestions   and those first two of the Chairman's three transformational elements - are therefore centered on people.   And while the term "transformation" implies geometric rather than incremental changes incorporating revolutionary rather than evolutionary ideas, the inertia of human nature makes such leaps and bounds difficult to accomplish.   As a result, none of my ideas are earth shattering or can be easily implemented overnight. Some of them are based on things that have bothered me for a long time, and some are the result of rather recent events.   My own developmental testing background and service affiliation may have even influenced some of these ideas, although I've tried to keep any resulting biases out of this paper.

The Intellectual Element

General Myers stated that understanding transformation starts with the intellectual element.' People need to know who they are, what their service is about, and what is expected of them. In my case, I wasn't even aware a JT&E Program Office existed until I began conducting research for this paper.   Adding a quick primer about this organization to the various test pilot schools' curriculums would be most beneficial to those of us starting out in the test and evaluation community. This education could then be expanded in the many Defense Acquisition University courses we're required to take in order to reach higher certification levels.   Furthermore, providing copies of the JT&E handbooks would be welcome and useful additions to our professional libraries. Unfortunately, these suggestions only apply to the DT community. Since most operational testers are Weapons School graduates, maybe incorporating a piece on how DT and OT fit into the overall test process into *that* curriculum would also pay dividends.

The Cultural Element

The Chairman's second transformation pillar has numerous applications within the test and evaluation community.   The first step in this cultural transformation should deal with the stovepipes within and among our military units and services.   There's nothing wrong with healthy competition among the different specialties, such as friendly jousting between F-15 and F-16 fighter pilots in the baron a Friday night. The jokes. and ribbing can get downright brutal sometimes, but when duty calls, we re all glad to be on the same team. But there *is* something wrong with having my credibility questioned because I wear a Test Pilot School Graduate patch on my flight suit instead of a Weapons School Graduate patch. I shouldn't have to be accompanied by a "Target Arm" when I'm giving a presentation on test results affecting the employment of a certain weapon; I shouldn't need him or her to validate my briefing in order for

it to be accepted by the audience.   The fact that I'm a professional in uniform should be validation enough (not to mention the fact that I wear a 2000-hour F-16 patch on my other arm!).

Similarly, I shouldn't need to be accompanied by a Navy tester when I give a presentation to members of my sister service.   We *are* working to 'get past these stovepipes and trying to be more joint in our endeavors, but I think we still .have a ways to go. At my last assignment, for example, we had a Navy test pilot and two Weapons, School graduates attached, to our squadron. In fact, the Navy guy actually graduated from the US Air Force Test Pilot School! Additionally, we sent our Weapons School graduates to a two-week test pilot introduction course in Mojave, CA. This shows we're making headway to overcome the stovepipes, especially within the T&E community, but we still have some work to do with the rest of the service cultures.

The Air Force culture easily recognizes the prestige of our Weapons School and its graduates; it doesn't readily acknowledge the "Golden Arms" of the test and evaluation community. In fact, the testers are often saddled with the blame for program schedule slips and cost overruns when technical difficulties arise. Historically, according to the Honorable Thomas P. Christie, Director of Operational Test and Evaluation, "When these technical problems surfaced, primarily in development testing, the stretch-out and cost growth cycle began.   We found that the messenger of bad tidings, most often 'the T&E community, was then tarred with responsibility for the stretch outs."[8] This is a classic case of shooting the messenger rather than trying to solve the root of the problem.

Another way to tackle the stovepipes between the DT and OT communities is to work together on test programs. Eglin AFB, FL, provides such an opportunity by having a squadron of developmental testers located adjacent to an operational test squadron. One of the programs I worked on while stationed there in the mid-1990s was the High-speed Anti-Radiation Missile

(HARM) Targeting System (HTS).   A combined team from the DT and OT communities, "Golden Arms" and "Target Arms" alike, deployed to Edwards AFB, CA, for a series of combined DT/OT testing of the HTS.   We flew together in the same 4-ship flights, even rode in each other's two-seat F-16s, recording both quantitative and qualitative data.   We were able to see how "the other side" did business and gained an appreciation for it. It's not unnatural to criticize something that's unfamiliar; this program served to break that barrier, even if it was for just.' the small handful of us. True, this is but one minor example, but one with positive lessons that shouldn't have to be re-learned throughout the test and evaluation community. There is a golden opportunity to take advantage of this concept on the western US test ranges. Operational testers from Nellis AFB, NV, and developmental testers from either Edwards AFB or China Lake Naval Air Station, CA, could easily meet for combined testing on either of the two ranges. It's a shame we don't.

Let's turn now from the joint to, the Joint arena, that is, from cooperation among the services to endeavors that may also include coalition partners and civilian contractors and agencies. One of the biggest cultural dilemmas in this arena deals with fielding systems before they are thoroughly tested.   There are some success stories, such as JSTARS during the first Gulf War. Unfortunately there are also some failures. Tragically some of these have cost people their lives.

The Bradley Fighting Vehicle is one example of a "buy now, fix later" philosophy that was so prevalent during the 1960s, 1970s, and early 1980s. The Bradley is an armored personnel carrier designed to replace the M-113, whose armor wasn't thick enough to protect its troops from anything larger than small arms fire. Although the Bradley was first deployed in 1983, it wasn't live-fire tested until 1985, at which point it was found to' be highly vulnerable to anti-armor weapons.   Additionally, the "unsinkable" Bradley wasn't!   After the 11th Bradley

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swamped at Fort Benning, GA, the US Army suspended operations until the problem could be corrected. [9] The saga was even documented in a made-for-HBO television *comedy* (based on a true story, of course) titled *The Pentagon Wars* in 1998. [10] Fortunately these incidents did not result in any loss of life due to the rush to field the system before it was thoroughly tested for effectiveness and suitability. Such is not the case for my next example.

The Air Force's T-3 Firefly initial trainer aircraft offers another illustration of what can happen when a system is not properly tested prior to being fielded. In 1995, the, US Air Force Academy replaced its aging T-41 fleet with the new T-3 The T-41 had an impeccable safety. record: in over 30 years of dedicated service, there had never been a single fatality. In the first 28 months of flying T-3s, however, there were three crashes and six fatalities. The first occurred on 22 February 1995 during spin training. The second happened on 30 September 1996 when the single propeller-driven engine quit in the landing pattern. The final accident took place on 25 June 1997, again when the engine failed, this time at low altitude. The plane was finally permanently grounded a month later, when another aircrew experienced engine failure, this time (fortunately) overhead the airfield and in a position to dead-stick the aircraft to the runway." Investigators discovered that the aircraft had not been properly tested at the higher absolute and lower density altitudes of the Academy airfield (field elevation of 6,572 feet) which could help explain the aircraft's poor performance during spin recoveries and its susceptibility to engine malfunctions during control setting changes.

These two examples highlight the cultural dilemma surrounding the pressures to field a. system before it is ready. Sometimes that pressure comes from senior service leadership; sometimes it is self-imposed by the contractor supplying the system. The common sense suggestion is to not do it; why risk human lives just to meet a deadline or milestone? I realize

that there is much more to both of these stories. My intent in using them is to point out the problem with not fully appreciating technical challenges that may face a program from the beginning. Simply sweeping them under, the proverbial rug can have severe consequences. We in the T&E community must therefore be prepared to call, for a timeout and address these challenges rather than overlooking them in the hope they'll go away.

The multi-service V-22 Osprey provides another example of a cultural transformation that needs to take place within the test and evaluation environment. The tilt-rotor aircraft program actually began way back in the early 1980s ' as` a replacement for the CH=46 troop transport helicopters. Three of the first 15 V-22s delivered were involved in fatal crashes, killing a total of 30 Marines since tests began in 1986. [12] The most horrific of these was the 8 April 2000 crash in Arizona that killed all 19 Marines onboard. The most recent crash was on 11 December 2000 in North Carolina, where the crew of four perished. Among them was the pilot, a Marine Corps Lieutenant Colonel who was chief of the Osprey testing program and slated to become commander of the first operational squadron. [13] Although the April crash was blamed on pilot error, the December crash which killed the most experienced Osprey pilot in the program was caused in part by a hydraulic failure. According to the Osprey Program Manager, USMC Colonel Nolan Schmidt, in his testimony to the US Senate Armed Services Committee in April 2001, there had been earlier catastrophic hydraulic failures similar to the one that led to the North Carolina crash. The most recent failure occurred during a February 2000 operations evaluation (OPEVAL), information that Schmidt hadn't received until a' week prior to his testimony. Schmidt stated the "lack of effective communications ... was an outgrowth of deliberately separate test and program office structures." He further charged that "contact between OPEVAL and the program office is a `deviation from the norm. „[14]

This case highlights the cultural dilemma — albeit in a very simplified manner - of whether or not to be the bearer of bad news. There is credence to the argument of not wanting to overload "the loss" with trivial problems that can be solved at a lower level, and within a small organizatiop that may be easy to do. But when it comes to a large acquisition program, where the corisequences are often measured in human lives, this dilemma becomes anything but trivial.

The V-22 case also highlights the need to get government testers involved early in the process. Having the contractor do the testing is like kissing your sister. Early involvement also injects a feeling of teamwork rather than an us-versus-them mentality. Integrated Product Teams consisting of contractors and government representatives help overcome this cultural dilemma.

An important point to emphasize here is the absolute requirement for transformation. buy-in at the highest levels of leadership. If these cultural changes are not totally espoused by our most senior leaders right from the start, in the different services and in the different T&E communities, then the ideas will once again die on the vine. Leaders must "walk the talk" if there is any hope of accomplishing any of these cultural transformations. As Mr. Christie stated, "We've never really taken. [these reform efforts] to heart; granted, we ...continue to make changes to the process, but we have yet to really come to grips with some of the root causes."[15] The Fitzhugh Commission tried to push a change to the process, but it seems to me it was about as effective as pushing a wet noodle. That noodle will only be effective if it gets pulled from the top.

The Technological Element

The third and final element of the Chairman's transformation vision deals with technology, which in the test and evaluation world translates to infrastructure. Technologies such as video teleconferencing and speakerphones allow real-time briefings and debriefings, making it easier for units at different locations (such as Nellis and Edwards) to test together. But as the systems under

test become increasingly more complex, the required data rates, and volumes also multiply. Telemetry coverage and quality therefore become increasingly important, which further results in bandwidth limitations and frequency management problems.   Dealing with these challenges requires fostering relationships with civilian organizations such as the FAA, thereby driving the requirement for Joint testing to be in fact spelled with a capital J.

CONCLUSION

The idea of acquisition, reform is not new. Neither are' most of the suggestions I offer on how, to make the test and evaluation community more efficient and effective.   What is new is this idea of transformation, of changing how we think and, feel about the work we do as testers.   The 21" Century has certainly brought on a new set of challenges: rapid technology advances, less well-defined threats, and concerns over homeland security.   As Mr. Christie put it, "We [the T&E community] must seriously consider restructuring our thinking to better meet the new challenges. "[1,16]

We can begin this transformation by educating our DT. and OT communities in each other's requirements and ways of doing business. We need. to break down the stovepipes within and among the services. We must ensure our systems are sufficiently tested before being fielded. We shouldn't be afraid to speak up when a problem arises. We need to be involved early in the test process. And we need buy-in from our senior leaders. Again, our ultimate responsibility as testers is to figure out "how to get more effective and suitable systems into the hands of our operational combat forces more rapidly and at less costs to the taxpayers."[17]   Maybe this latest entry onto the storied list of buzzwords and catchphrases - *transformation - will* actually be the catalyst we've been waiting for to reform our joint test and evaluation mindsets and processes. We can only hope so.

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[6] Myers', page ° 1.

[7] Myers; page 6.

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